DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

May 1, 2006
PLANS APPROVAL DATE

Dallas Forester
No. C37765
Exp. 12-31-06
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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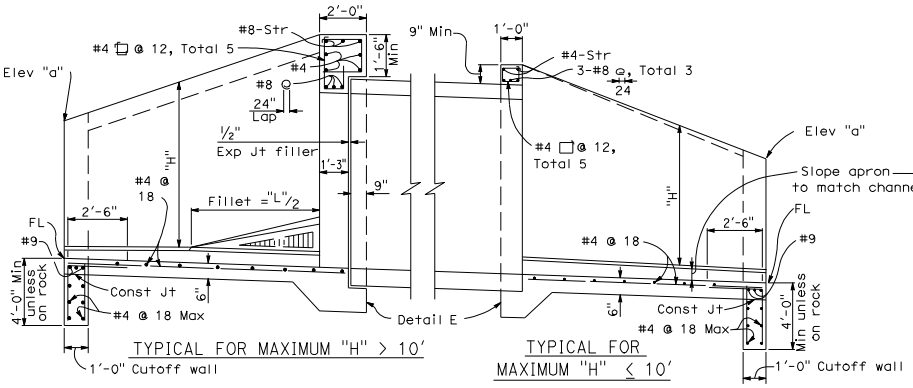
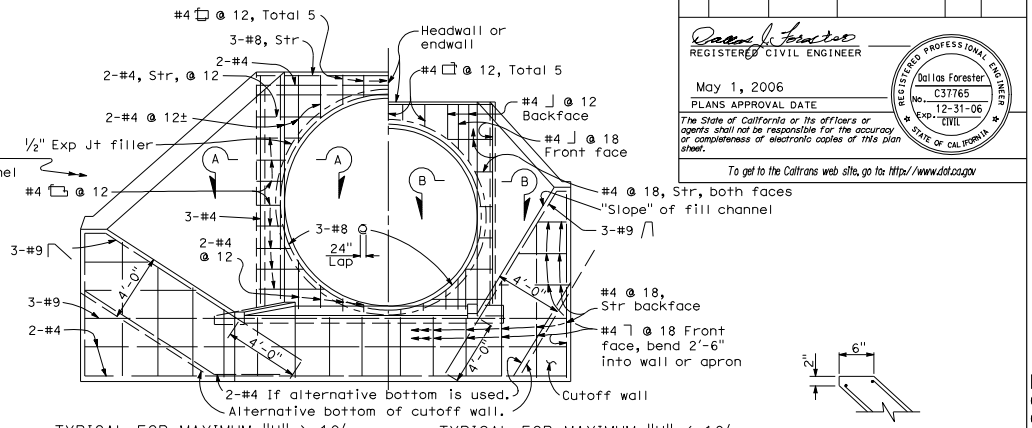


TYPICAL FOR MAXIMUM "H" > 10'

TYPICAL FOR MAXIMUM "H" ≤ 10'



TYPICAL FOR MAXIMUM "H" > 10'

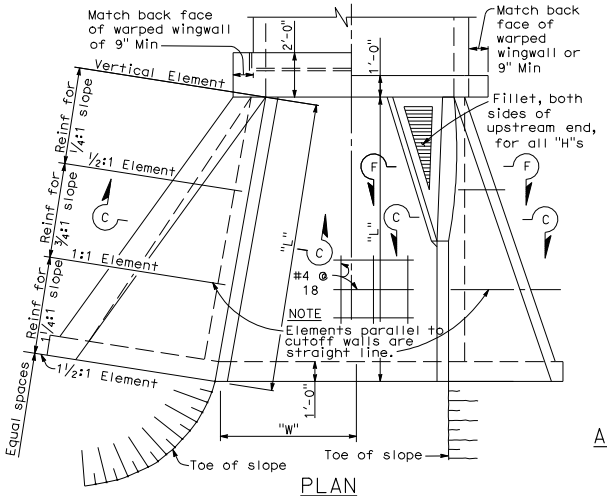
TYPICAL FOR MAXIMUM "H" ≤ 10'

WITHOUT STIFFENING BEAM

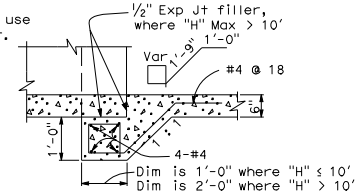
NOTE:

RCP shown. Metal pipe similar except eliminate the expansion joint and use hook bolts @ 1'-7" ± spacing. Size and length provided by manufacturer.

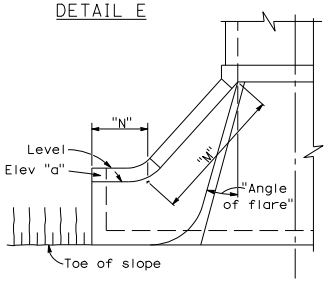
PART LONGITUDINAL SECTION



PLAN



DETAIL E

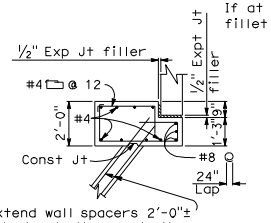


ALTERNATIVE WARPED WINGWALL

Use where additional protection to toe of embankment is required. If at upstream end, fillet is not shown.

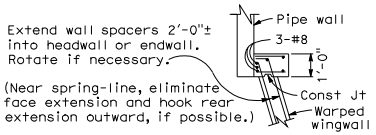
END ELEVATION

If at upstream end, fillet is not shown.

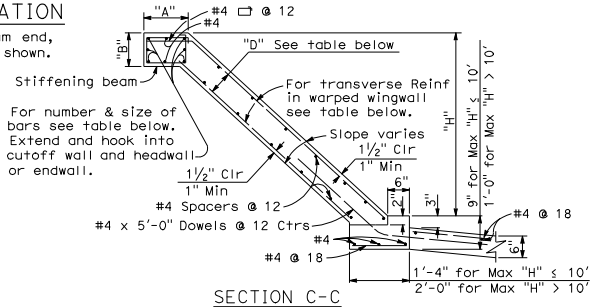


Extend wall spacers 2'-0"± into headwall or endwall

SECTION A-A

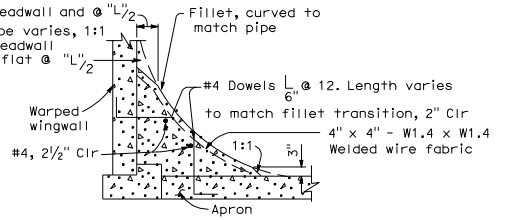


SECTION B-B



SECTION C-C

Where abrasion is anticipated, increase apron thickness to 7" minimum to provide 2" minimum reinforcement coverage.



SECTION F-F

WARPED WINGWALLS

WALL DIMENSIONS AND REINFORCING									STIFFENING BEAM DIMENSIONS AND REINFORCING										
Element Slope	"H"	8' or less	10'	12'	14'	16'	18'	20'	"H" Max	"L" 12'	14'	16'	18'	20'	25'	30'	35'	40' or more
¼:1	Front face Reinf	#4 @ 12	#4 @ 7	#5 @ 7	#5 @ 5	#6 @ 6	#7 @ 7	#7 @ 6	6'	No beam. Place 2-#6 in each face along top of wall.								
	Rear face Reinf	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	8'									
¾:1	Front face Reinf	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 10	#4 @ 8	#4 @ 6	10'	"A"= 1'-0"								
	Rear face Reinf	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 10	#4 @ 7	#4 @ 6	#5 @ 8	12'	"B"= 9"				"A"= 1'-6"				
1¼:1	Front face Reinf	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	14'	Total 6-#6		"B"= 1'-0"		"A"= 1'-10"				
	Rear face Reinf	#4 @ 8	#4 @ 8	#4 @ 5	#5 @ 6	#6 @ 7	#6 @ 6	#7 @ 6	16'					"B"= 1'-0"	"A"= 2'-0"			
"D" at Cutoff Wall		6"	6"	6"	7½"	8"	9½"	11"	18'	Total 6-#7			Total 6-#8	"B"= 1'-6"				
"D" at Culvert		6"	6"	6"	8"	9½"	11"	1'-1"	20'					Total 8-#9				

NOTES: Walls designed for 2'-0" surcharge; earth density = 120 LB/CF; equivalent fluid pressure = 36 LB/CF.
Vary "D" of warped wall uniformly from that at cutoff wall to that at headwall or endwall, for maximum "H" > 12'-0".
Dimensions "L", "W", "H", "M", "N", Elevation "a", Angle of flare", and end "Slope" (as apply) are shown on the plans.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

PIPE CULVERT HEADWALLS, ENDWALLS AND WARPED WINGWALLS

NO SCALE

D86B

8-8-05